

# PATENT ABSTRACTS OF JAPAN

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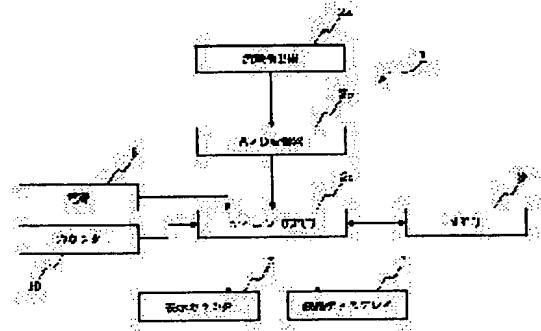
(21)Application number : 06-016376 (71)Applicant : CANON INC  
(22)Date of filing : 10.02.1994 (72)Inventor : KAWAOMO IKUO

## (54) FLOW RATE DETECTOR, TERMINAL EQUIPMENT AND METER INSPECTION SYSTEM USING THESE DETECTOR AND EQUIPMENT

### (57)Abstract:

**PURPOSE:** To prevent the reading and input mistakes in a meter inspection mode and to improve the efficiency of the meter inspection jobs by converting the detected flow rates of the city water, gas, electricity, etc., into the bar code data and displaying these flow rates in bar codes.

**CONSTITUTION:** A flow rate detector 2a detects the used amounts of city water, gas, electricity, etc., and an A/D converter 2b converts the flow rates detected by the detector 2a into the digital value. These digital flow rates are numerically shown on a display counter 2 by a CPU 2c. The CPU 2c also reads the bar code patterns out of a memory 9 in response to those flow rates changing momentarily and displays these patterns on a liquid crystal display 3 at each prescribed time interval counted by a counter 10. Thus a meter inspector turns a bar code reading scanner of his portable terminal equipment toward the display 3 to read the displayed bar code pattern. This read pattern is shown on the display screen of the portable terminal equipment and also stored in an internal memory. Then this bar code pattern can be inputted to a host computer.



### LEGAL STATUS

[Date of request for examination]

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**CLAIMS**

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**[Claim(s)]**

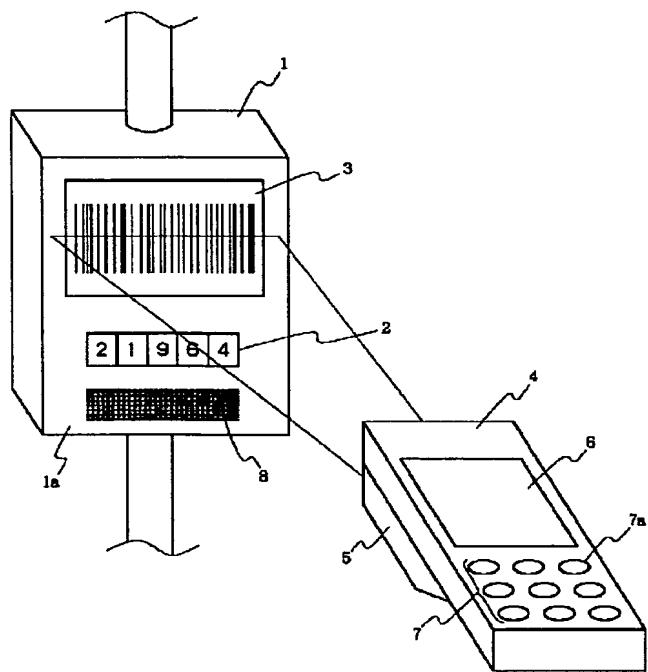
[Claim 1] Flow rate detection equipment characterized by to have a flow rate detection means detect flow rates, such as a waterworks, gas, and electrical and electric equipment, a conversion means change into bar KODODE-TA flow rates, such as a waterworks detected by this flow rate detection means, gas, and electrical and electric equipment, and a display means display bar KODODE-TA changed by this conversion means as a bar code.

[Claim 2] The terminal unit which has a reading means to read the bar code displayed on the liquid crystal display means.

[Claim 3] The inspection-of-a-meter system using the flow rate detection equipment which has a flow rate detection means detect flow rates, such as a waterworks, gas, and the electrical and electric equipment, a conversion means change into bar code data flow rates, such as the waterworks detected by this flow rate detection means, gas, and the electrical and electric equipment, and a display means display bar KODODE-TA changed by this conversion means as a bar code, and the terminal unit for the inspection of a meter which have the reading means read the bar code displayed on said display means.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the terminal unit used for the meter box which displays the amount used, such as a waterworks used at a home, works, etc., gas, and electrical and electric equipment, and its inspection-of-a-meter activity, and the inspection-of-a-meter system using them.

[0002]

[Description of the Prior Art] Conventionally, the inspection-of-a-meter activity of the flow rate detection equipment (henceforth a meter box) which displays operating flow rates, such as a waterworks used at a home, works, etc., gas, and electrical and electric equipment, was done by viewing of a meter reader.

[0003]

[Problem(s) to be Solved by the Invention] The meter reader who visited had to read the numeric value of the amount used, such as a waterworks conventionally displayed on the counter of meter boxes, such as a home, gas, and electrical and electric equipment, the numeric value had to be inputted by the keyboard of pocket mold terminal units, such as a handy terminal, and the activity of having memorized in the memory built in there and going had to be done.

[0004] Therefore, there was a trouble that an incorrect input occurred by the mistake at the time of reading of a meter reader's counter and the mistake at the time of a key input, and the working efficiency of the meter reader to a pocket mold terminal unit fell remarkably in case of rainy weather etc.

[0005] Furthermore, also in such a case, there was a trouble that reading of the numeric value of a counter may be difficult and the working efficiency of the meter reader to a pocket mold terminal unit fell remarkably by the installation of a meter box etc.

[0006] The 1st object of this invention aims at offering the flow rate detection equipment and the terminal unit which solved the above-mentioned technical problem, and the inspection-of-a-meter system using them by changing into bar code data the flow rate value detected by flow rate detection equipments, such as a waterworks, gas, and electrical and electric equipment, and displaying as a bar code.

[0007] The 2nd object of this invention aims at offering the flow rate detection equipment and the terminal unit which can attain the increase in efficiency of an inspection-of-a-meter activity by enabling it to read the bar code displayed by said flow rate detection equipment with the terminal unit which a meter reader carries, and the inspection-of-a-meter system using them.

[0008]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the meter box concerning this invention is equipped with a flow rate detection means to detect flow rates, such as a waterworks, gas, and electrical and electric equipment, a conversion means change into bar code data flow rates, such as a waterworks detected by this flow rate detection means, gas, and electrical and electric equipment, and a display means display the bar code data changed by this conversion means as a bar code.

[0009] In addition, specifically, there are a super twist nematic (STN) liquid crystal display panel, a active-matrix liquid crystal display panel, etc. as the above-mentioned display means.

[0010] Moreover, the terminal unit concerning this invention is equipped with a reading means to read

a bar code.

[0011] Specifically, this reading means is optical scanner equipments, such as a laser scanner.

[0012] Furthermore, a flow rate detection means by which the inspection-of-a-meter system concerning this invention detects flow rates, such as a waterworks, gas, and electrical and electric equipment, A conversion means to change into bar code data flow rates, such as a waterworks detected by this flow rate detection means, gas, and electrical and electric equipment, The flow rate detection equipment which has a display means to display the bar code data changed by this conversion means as a bar code, and the terminal unit which has a reading means to read the bar code displayed on said display means are used.

[0013]

[Function] Based on the above configuration, the flow element (2a) of the flow rate detection equipment (1) which displays operating flow rates, such as a waterworks, gas, and electrical and electric equipment, detects a flow rate, and the flow rate value is changed into digital value with an A/D converter (2b). While carrying out a digital readout to a display counter (2) with a microcomputer (2c), the bar code data corresponding to said digital value are read from memory 9 for every predetermined time clocked by the counter (10), and it displays on a liquid crystal display (3) as a bar code. In addition, you may make it make it display here by operating the switch formed in flow rate detection equipment (1) etc., without displaying a bar code for every predetermined time.

[0014] On the other hand, the bar code displayed on the liquid crystal display (3) is read with the laser scanner (5) with which the terminal unit (4) of the pocket mold which a meter reader has was equipped. This laser scanner (5) is driven through a scanner driver (12) with a microcomputer (11). The bar code data read with the laser scanner (5) are memorized in memory (13), or a microcomputer (11) displays them on a display (6) as a numeric value. Moreover, reading of a bar code with a laser scanner (5) is started by the thing which was prepared in the keyboard (7) and which read and carries out the depression of the initiation key (7a).

[0015] In addition, although the sign in the above-mentioned parenthesis is for contrasting with a drawing, it does not limit the configuration of this invention at all.

[0016]

[Example] Hereafter, the example of this invention is explained based on a drawing.

[0017] Drawing 1 is drawing corresponding to the amount used displayed on the meter box 1 which is flow rate detection equipment which displays the amount used, such as a waterworks concerning this invention, gas, and electrical and electric equipment, and its display counter 2 which reads a bar code and in which showing the terminal unit 4 of a pocket mold.

[0018] A liquid crystal display 3 displays the above-mentioned bar code which shows the amount used, such as a waterworks, gas, and electrical and electric equipment, at intervals of predetermined time.

[0019] Moreover, the laser scanner 5 for reading a bar code is formed in this pocket type of terminal unit 4.

[0020] Generally, in order to read a bar code remotely by the laser scanner, if there is a 2 or more twice as many monochrome contrast ratio for reading as this, it is supposed that it is possible. on the other hand, since a contrast ratio changes with the include angles which look at a screen in a liquid crystal display, it is usually shown by the maximum contrast and, as for this value, 100 or more times is attained by STN (the super twist — nematic) liquid crystal with about 10 times and active matrix liquid crystal. Therefore, if it is from the location which carried out the right pair to the screen to some extent when it was such a liquid crystal display panel, distinction of the monochrome contrast by the laser scanner is possible.

[0021] Furthermore, as general bar code specification, although EAN, UPC, etc. are used, the bar dimension is set to 0.26-0.56mm, and it also sets to a liquid crystal module, and a high definition thing is dot size 0.2mm. Since it is to extent, creation of the liquid crystal display panel which displays the bar code corresponding to the above-mentioned specification is possible.

[0022] Therefore, a configuration like drawing 1 is realizable by carrying out the liquid crystal display of the bar code of the line breadth corresponding to the resolving power of a laser scanner.

[0023] As described above, the display counter 2 is formed in front-panel 1a of a meter box 1. Moreover, as for the individual power source and said display counter 2 of solar-battery 8 grade, said liquid crystal display 3 which changes said amount used into a bar code, and is displayed is separately

formed in front-panel 1a of this meter box 1.

[0024] Moreover, the circuitry of the meter box 1 interior is shown in drawing 2.

[0025] It is the flow element with which 2a detects operating flow rates, such as a waterworks, gas, and electrical and electric equipment, in drawing 2. The A/D converter which 2b carries out A/D conversion of the flow rate value detected with the flow element, and is changed into digital value. Moreover, 2c reads the bar code pattern corresponding to the flow rate value (digital value) which carries out the digital readout of the flow rate value by which digital conversion was carried out to the display counter 2, or changes every moment from memory 9. It is the microcomputer (CPU) displayed on a liquid crystal display 3 for every predetermined time interval clocked by the counter 10.

[0026] In addition, there are a part which consists of RAM (random access memory) which can write in data, and a part which consists of a ROM (read only memory) which data can only read in memory 9. The bar code pattern corresponding to a numeric value, the control program, etc. are memorized by the ROM part.

[0027] Drawing 3 shows the circuitry of the terminal unit 4 interior.

[0028] In drawing 3, a keyboard 7 has reading initiation key 7a, a numerical keypad, etc., and a microcomputer (CPU) 11 drives a laser scanner 5 through the scanner driver 12 corresponding to the depression of reading initiation key 7a. Moreover, a microcomputer (CPU) 11 changes the read bar code data into a numeric value etc., and it displays on a display 6 or it memorizes them in memory 13. The display 6 may consist of liquid crystal display panels, and may be constituted by CRT (cathode ray tube).

[0029] In addition, there are a part which also becomes the above-mentioned memory 13 from RAM (random access memory) which can write in data, and a part which consists of a ROM (read only memory) which data can only read, and the character pattern, the control program, etc. are memorized by the ROM part.

[0030] A meter reader presses the reading initiation key 7 towards the above-mentioned liquid crystal display 3 in the range which laser reaches in the laser scanner 5 for bar code reading of the terminal unit 4 of the above-mentioned pocket mold. Here, a meter reader can be told by a beep sound etc. about whether reading of a bar code was completed to normal (or abnormalities).

[0031] It is stored in internal memory and the read data can also be inputted into a host computer by the meter reader while being indicated by the content in the display screen 6 of the terminal unit 4 of the above-mentioned pocket mold.

[0032] (Other examples) Although the information displayed on a liquid crystal display 3 was only the amount used, such as a waterworks, gas, and electrical and electric equipment, you may make it make the individual information (information which carried out code conversion of a householder name, the address, etc.) for every household make display by the bar code simultaneously and read collectively in the above-mentioned example.

[0033] Moreover, although the bar code displayed on a liquid crystal display 3 was displayed for every predetermined time interval in the above-mentioned example, only when a meter reader comes a meter box for the inspection of a meter, a bar code may be displayed by displaying a bar code with the switch formed in the meter box, or carrying out the depression of the predetermined key prepared in the terminal unit. Furthermore, a meter reader detects having come in front of the meter box by the sensor in which it was prepared in the meter box, and may be made to indicate the bar code by automatic.

[0034]

[Effect of the Invention] According to the meter box concerning this invention, a terminal unit, and the inspection-of-a-meter system using them An incorrect input occurs by the mistake at the time of reading of a meter reader's counter in the inspection-of-a-meter activity of a meter box, and the mistake at the time of a key input, or moreover, in case of rainy weather etc. It is lost that the working efficiency of the meter reader to a terminal unit falls remarkably, and further, by the installation of a meter box etc., also when reading of the numeric value of a counter is difficult, it can also be canceled that the working efficiency of the meter reader to a terminal unit falls remarkably.

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TECHNICAL FIELD

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[Industrial Application] This invention relates to the terminal unit used for the meter box which displays the amount used, such as a waterworks used at a home, works, etc., gas, and electrical and electric equipment, and its inspection-of-a-meter activity, and the inspection-of-a-meter system using them.

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**PRIOR ART**

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**[Description of the Prior Art]** Conventionally, the inspection-of-a-meter activity of the flow rate detection equipment (henceforth a meter box) which displays operating flow rates, such as a waterworks used at a home, works, etc., gas, and electrical and electric equipment, was done by viewing of a meter reader.

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EFFECT OF THE INVENTION

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[Effect of the Invention] It is lost that according to the meter box concerning this invention, a terminal unit, and the inspection-of-a-meter system using them an incorrect input occurs by the mistake at the time of reading of a meter reader's counter in the inspection-of-a-meter activity of a meter box and the mistake at the time of a key input, and the working efficiency of the meter reader to a terminal unit falls remarkably in case of rainy weather etc., and it is the installation of a meter box etc. further. Also when reading of the numeric value of a counter is difficult, it can also be canceled that the working efficiency of the meter reader to a terminal unit falls remarkably.

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## TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] The meter reader who visited had to read the numeric value of the amount used, such as a waterworks conventionally displayed on the counter of meter boxes, such as a home, gas, and electrical and electric equipment, the numeric value had to be inputted by the keyboard of pocket mold terminal units, such as a handy terminal, and the activity of having memorized in the memory built in there and going had to be done.

[0004] Therefore, there was a trouble that an incorrect input occurred by the mistake at the time of reading of a meter reader's counter and the mistake at the time of a key input, and the working efficiency of the meter reader to a pocket mold terminal unit fell remarkably in case of rainy weather etc.

[0005] Furthermore, also in such a case, there was a trouble that reading of the numeric value of a counter may be difficult and the working efficiency of the meter reader to a pocket mold terminal unit fell remarkably by the installation of a meter box etc.

[0006] The 1st object of this invention aims at offering the flow rate detection equipment and the terminal unit which solved the above-mentioned technical problem, and the inspection-of-a-meter system using them by changing into bar code data the flow rate value detected by flow rate detection equipments, such as a waterworks, gas, and electrical and electric equipment, and displaying as a bar code.

[0007] The 2nd object of this invention aims at offering the flow rate detection equipment and the terminal unit which can attain the increase in efficiency of an inspection-of-a-meter activity by enabling it to read the bar code displayed by said flow rate detection equipment with the terminal unit which a meter reader carries, and the inspection-of-a-meter system using them.

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MEANS

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[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the meter box concerning this invention is equipped with a flow rate detection means to detect flow rates, such as a waterworks, gas, and electrical and electric equipment, a conversion means change into bar code data flow rates, such as a waterworks detected by this flow rate detection means, gas, and electrical and electric equipment, and a display means display the bar code data changed by this conversion means as a bar code.

[0009] In addition, specifically, there are a super twist nematic (STN) liquid crystal display panel, a active-matrix liquid crystal display panel, etc. as the above-mentioned display means.

[0010] Moreover, the terminal unit concerning this invention is equipped with a reading means to read a bar code.

[0011] Specifically, this reading means is optical scanner equipments, such as a laser scanner.

[0012] Furthermore, a flow rate detection means by which the inspection-of-a-meter system concerning this invention detects flow rates, such as a waterworks, gas, and electrical and electric equipment, A conversion means to change into bar code data flow rates, such as a waterworks detected by this flow rate detection means, gas, and electrical and electric equipment, The flow rate detection equipment which has a display means to display the bar code data changed by this conversion means as a bar code, and the terminal unit which has a reading means to read the bar code displayed on said display means are used.

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## OPERATION

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[Function] Based on the above configuration, the flow element (2a) of the flow rate detection equipment (1) which displays operating flow rates, such as a waterworks, gas, and electrical and electric equipment, detects a flow rate, and the flow rate value is changed into digital value with an A/D converter (2b). While carrying out a digital readout to a display counter (2) with a microcomputer (2c), the bar code data corresponding to said digital value are read from memory 9 for every predetermined time clocked by the counter (10), and it displays on a liquid crystal display (3) as a bar code. In addition, you may make it make it display here by operating the switch formed in flow rate detection equipment (1) etc., without displaying a bar code for every predetermined time.

[0014] On the other hand, the bar code displayed on the liquid crystal display (3) is read with the laser scanner (5) with which the terminal unit (4) of the pocket mold which a meter reader has was equipped. This laser scanner (5) is driven through a scanner driver (12) with a microcomputer (11). The bar code data read with the laser scanner (5) are memorized in memory (13), or a microcomputer (11) displays them on a display (6) as a numeric value. Moreover, reading of a bar code with a laser scanner (5) is started by the thing which was prepared in the keyboard (7) and which read and carries out the depression of the initiation key (7a).

[0015] In addition, although the sign in the above-mentioned parenthesis is for contrasting with a drawing, it does not limit the configuration of this invention at all.

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EXAMPLE

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[Example] Hereafter, the example of this invention is explained based on a drawing.

[0017] Drawing 1 is drawing corresponding to the amount used displayed on the meter box 1 which is flow rate detection equipment which displays the amount used, such as a waterworks concerning this invention, gas, and electrical and electric equipment, and its display counter 2 which reads a bar code and in which showing the terminal unit 4 of a pocket mold.

[0018] A liquid crystal display 3 displays the above-mentioned bar code which shows the amount used, such as a waterworks, gas, and electrical and electric equipment, at intervals of predetermined time.

[0019] Moreover, the laser scanner 5 for reading a bar code is formed in this pocket type of terminal unit 4.

[0020] Generally, in order to read a bar code remotely by the laser scanner, if there is a 2 or more twice as many monochrome contrast ratio for reading as this, it is supposed that it is possible. on the other hand, since a contrast ratio changes with the include angles which look at a screen in a liquid crystal display, it is usually shown by the maximum contrast and, as for this value, 100 or more times is attained by STN (the super twist — nematic) liquid crystal with about 10 times and active matrix liquid crystal. Therefore, if it is from the location which carried out the right pair to the screen to some extent when it was such a liquid crystal display panel, distinction of the monochrome contrast by the laser scanner is possible.

[0021] Furthermore, as general bar code specification, although EAN, UPC, etc. are used, the bar dimension is set to 0.26–0.56mm, and it also sets to a liquid crystal module, and a high definition thing is dot size 0.2mm. Since it is to extent, creation of the liquid crystal display panel which displays the bar code corresponding to the above-mentioned specification is possible.

[0022] Therefore, a configuration like drawing 1 is realizable by carrying out the liquid crystal display of the bar code of the line breadth corresponding to the resolving power of a laser scanner.

[0023] As described above, the display counter 2 is formed in front-panel 1a of a meter box 1.

Moreover, as for the individual power source and said display counter 2 of solar-battery 8 grade, said liquid crystal display 3 which changes said amount used into a bar code, and is displayed is separately formed in front-panel 1a of this meter box 1.

[0024] Moreover, the circuitry of the meter box 1 interior is shown in drawing 2 .

[0025] It is the flow element with which 2a detects operating flow rates, such as a waterworks, gas, and electrical and electric equipment, in drawing 2 . The A/D converter which 2b carries out A/D conversion of the flow rate value detected with the flow element, and is changed into digital value, Moreover, 2c reads the bar code pattern corresponding to the flow rate value (digital value) which carries out the digital readout of the flow rate value by which digital conversion was carried out to the display counter 2, or changes every moment from memory 9. It is the microcomputer (CPU) displayed on a liquid crystal display 3 for every predetermined time interval clocked by the counter 10.

[0026] In addition, there are a part which consists of RAM (random access memory) which can write in data, and a part which consists of a ROM (read only memory) which data can only read in memory 9. The bar code pattern corresponding to a numeric value, the control program, etc. are memorized by the ROM part.

[0027] Drawing 3 shows the circuitry of the terminal unit 4 interior.

[0028] In drawing 3 , a keyboard 7 has reading initiation key 7a, a numerical keypad, etc., and a

microcomputer (CPU) 11 drives a laser scanner 5 through the scanner driver 12 corresponding to the depression of reading initiation key 7a. Moreover, a microcomputer (CPU) 11 changes the read bar code data into a numeric value etc., and it displays on a display 6 or it memorizes them in memory 13. The display 6 may consist of liquid crystal display panels, and may be constituted by CRT (cathode ray tube).

[0029] In addition, there are a part which also becomes the above-mentioned memory 13 from RAM (random access memory) which can write in data, and a part which consists of a ROM (read only memory) which data can only read, and the character pattern, the control program, etc. are memorized by the ROM part.

[0030] A meter reader presses the reading initiation key 7 towards the above-mentioned liquid crystal display 3 in the range which laser reaches in the laser scanner 5 for bar code reading of the terminal unit 4 of the above-mentioned pocket mold. Here, a meter reader can be told by a beep sound etc. about whether reading of a bar code was completed to normal (or abnormalities).

[0031] It is stored in internal memory and the read data can also be behind inputted into a host computer by the meter reader while being indicated by the content in the display screen 6 of the terminal unit 4 of the above-mentioned pocket mold.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] Drawing showing the flow rate detection equipment (meter box) and the terminal unit concerning the example of this invention.

[Drawing 2] Drawing showing the circuitry of the flow rate detection equipment (meter box) concerning the example of this invention.

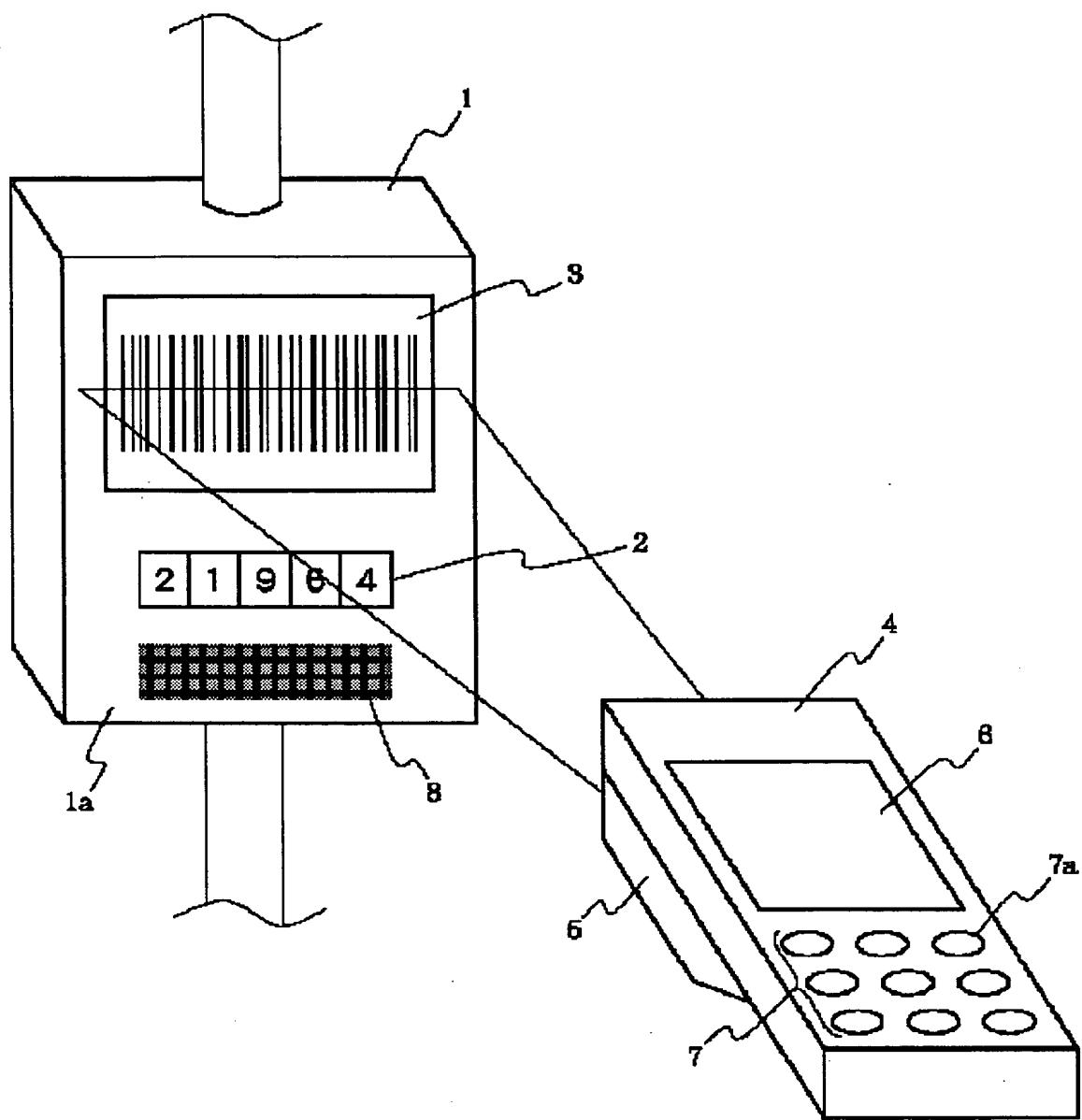
[Drawing 3] Drawing showing the circuitry of a terminal unit concerning the example of this invention.

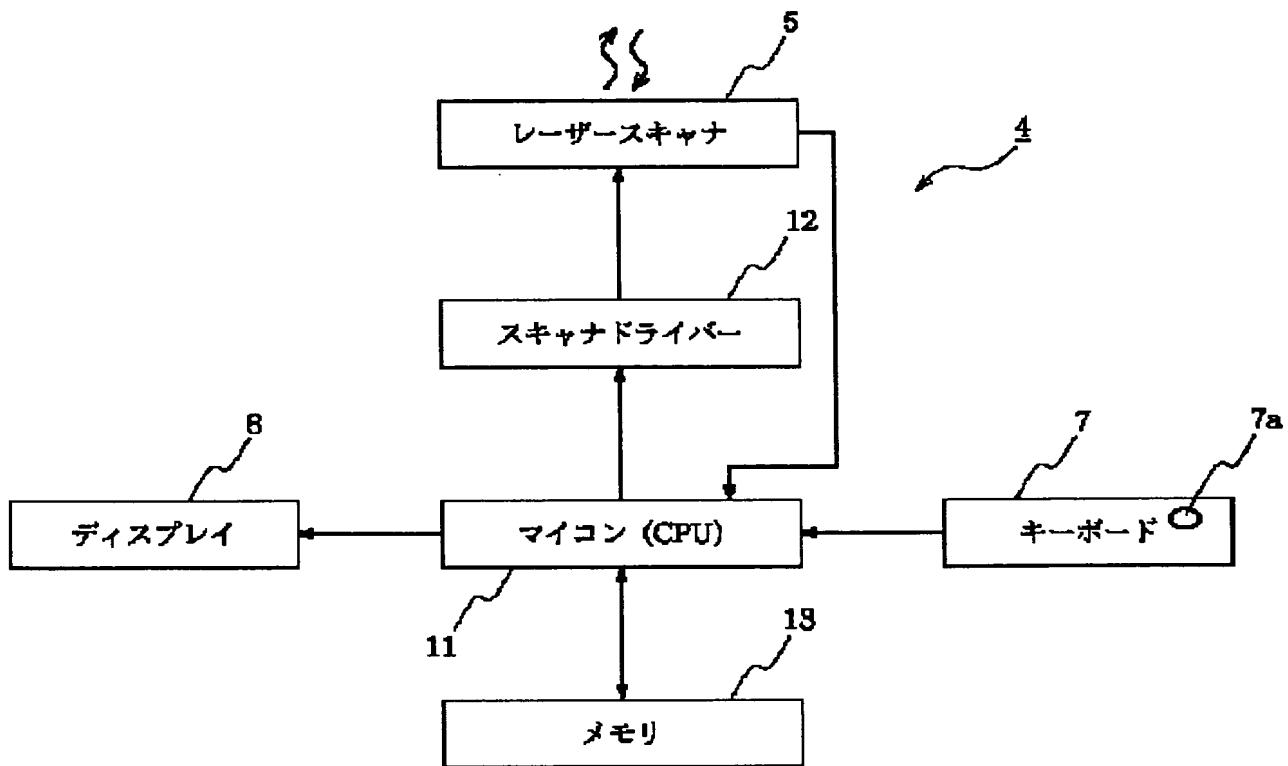
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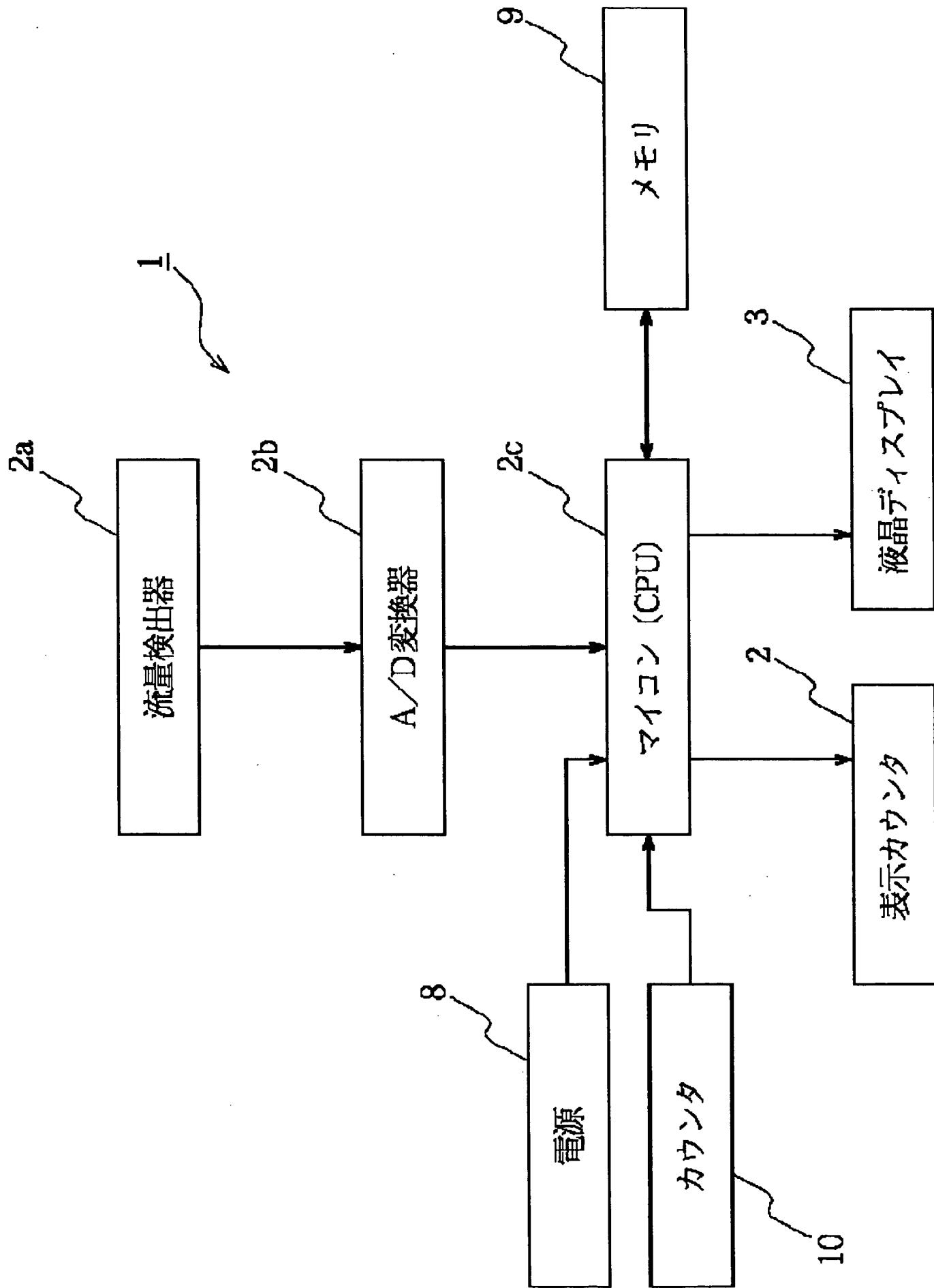
- 1 Meter Box
- 2 Display Counter
- 2a Flow element
- 2b A/D converter
- 2c Microcomputer (CPU)
- 3 Liquid Crystal Display
- 4 Pocket Mold Terminal Equipment
- 5 Laser Scanner
- 6 Display Screen
- 7 Keyboard
- 7a Reading initiation key
- 8 Power Source
- 9 13 Memory
- 10 Counter
- 11 Microcomputer (CPU)
- 12 Scanner Driver

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(19)日本国特許庁 (JP)

(12) 公開特許公報 (A)

(11)特許出願公開番号

特開平7-225890

(43)公開日 平成7年(1995)8月22日

(51)Int.Cl.*	識別記号	庁内整理番号	F I	技術表示箇所
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G 0 1 D 7/00	3 0 2	Z		
G 0 1 F 15/06				
G 0 6 F 17/60				
			G 0 6 F 15/ 21	3 1 0 Z
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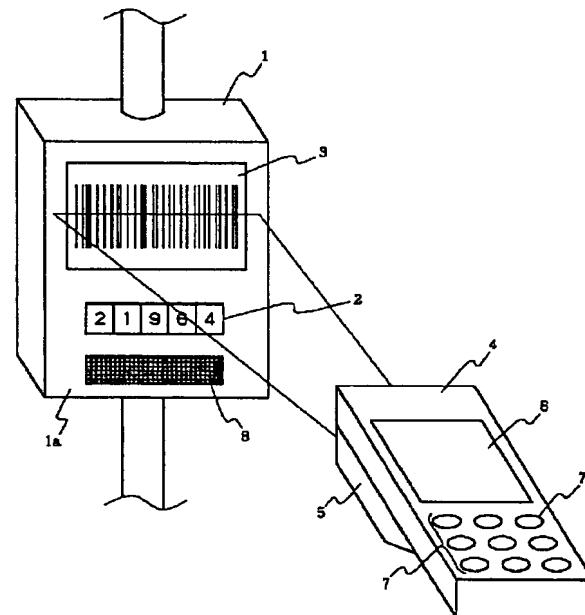
(21)出願番号	特願平6-16376	(71)出願人	000001007 キヤノン株式会社 東京都大田区下丸子3丁目30番2号
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(54)【発明の名称】 流量検出装置及び端末装置と、それらを利用した検針システム

(57)【要約】

【目的】 メータボックスの検針作業における、検針員のカウンタの読み取り時のミスや、キー入力時のミスにより誤入力が発生したり、また雨天等のとき、携帯型の端末装置への検針員の作業効率が著しく低下するということが防止し、更には、メータボックスの設置場所等によって、カウンタの数値の読み取りが困難な場合にも、上記端末装置への検針員の作業効率が著しく低下するのを解消することを目的とする。

【構成】 水道、ガス、電気等の流量を検出する流量検出手段と、該流量検出手段により検出された水道、ガス、電気等の流量をバーコードデータに変換する変換手段と、該変換手段により変換されたバーコードデータをバーコードとして表示する表示手段とを有する流量検出装置と、前記表示手段に表示されたバーコードを読み取る読み取り手段を有する端末装置とを利用する検針システムである。



## 【特許請求の範囲】

【請求項1】 水道、ガス、電気等の流量を検出する流量検出手段と、該流量検出手段により検出された水道、ガス、電気等の流量をバーコードデータに変換する変換手段と、該変換手段により変換されたバーコードデータをバーコードとして表示する表示手段とを有することを特徴とする流量検出装置。

【請求項2】 液晶表示手段に表示されたバーコードを読み取る読み取り手段を有する端末装置。

【請求項3】 水道、ガス、電気等の流量を検出する流量検出手段と、該流量検出手段により検出された水道、ガス、電気等の流量をバーコードデータに変換する変換手段と、該変換手段により変換されたバーコードデータをバーコードとして表示する表示手段とを有する流量検出装置と、

前記表示手段に表示されたバーコードを読み取る読み取り手段を有する検針用端末装置と、を利用する検針システム。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】 本発明は、家庭や工場等で使用される水道、ガス、電気等の使用量を表示するメータボックス及びその検針作業に使用される端末装置、それらを利用した検針システムに関するものである。

## 【0002】

【従来の技術】 従来、家庭や工場等で使用される水道、ガス、電気等の使用流量を表示する流量検出装置（以下メータボックスという）の検針作業は、検針員の目視により行なわれていた。

## 【0003】

【発明が解決しようとしている課題】 従来、家庭等のメータボックスのカウンタに表示された水道、ガス、電気等の使用量の数値は、訪れた検針員が読み取り、その数値をハンディターミナル等の携帯型端末装置のキーボードで入力して、そこに内蔵されたメモリに記憶していくという作業をしなければならなかった。

【0004】 そのために、検針員のカウンタの読み取り時のミスや、キー入力時のミスにより誤入力が発生したり、また雨天等のときは、携帯型端末装置への検針員の作業効率が著しく低下するという問題点があった。

【0005】 更に、メータボックスの設置場所等によつては、カウンタの数値の読み取りが困難な場合があり、このような場合も、携帯型端末装置への検針員の作業効率が著しく低下するという問題点があった。

【0006】 本発明の第1の目的は、水道、ガス、電気等の流量検出装置により検出される流量値をバーコードデータに変換してバーコードとして表示することにより、上述の課題を解決した流量検出装置及び端末装置と、それらを利用した検針システムを提供することを目

的とする。

【0007】 本発明の第2の目的は前記流量検出装置により表示されたバーコードを検針員が携帯する端末装置で読み取ることができるようにすることで、検針作業の効率化を図ることができる流量検出装置及び端末装置と、それらを利用した検針システムを提供することを目的とする。

## 【0008】

【課題を解決するための手段】 上記課題を解決するため10に、本発明に係るメータボックスは、水道、ガス、電気等の流量を検出する流量検出手段と、該流量検出手段により検出された水道、ガス、電気等の流量をバーコードデータに変換する変換手段と、該変換手段により変換されたバーコードデータをバーコードとして表示する表示手段とを備える。

【0009】 なお、上記表示手段として具体的には、スーパーツイストネマチック（S TN）液晶表示パネル、アクティブマトリクス液晶表示パネル等がある。

【0010】 また、本発明に係る端末装置は、バーコードを読み取る読み取り手段を備える。

【0011】 この読み取り手段は具体的には、レーザー・スキャナ等の光学的スキャナ装置である。

【0012】 更に、本発明に係る検針システムは、水道、ガス、電気等の流量を検出する流量検出手段と、該流量検出手段により検出された水道、ガス、電気等の流量をバーコードデータに変換する変換手段と、該変換手段により変換されたバーコードデータをバーコードとして表示する表示手段とを有する流量検出装置と、前記表示手段に表示されたバーコードを読み取る読み取り手段を有する端末装置とを利用するものである。

## 【0013】

【作用】 以上の構成に基づき、水道、ガス、電気等の使用流量を表示する流量検出装置（1）の流量検出器（2a）により流量を検出し、その流量値をA/D変換器（2b）によりデジタル値に変換して、マイクロコンピュータ（2c）により表示カウンタ（2）に数値表示するとともに、カウンタ（10）により計時された所定時間毎に、前記デジタル値に対応するバーコードデータをメモリ9から読み出して液晶ディスプレイ（3）にバーコードとして表示する。なお、ここで、所定時間毎にバーコードを表示させずに、流量検出装置（1）等に設けられたスイッチを操作することで表示させることもよい。

【0014】 一方、液晶ディスプレイ（3）に表示されたバーコードは、検針員が持つ携帯型の端末装置（4）に備えられたレーザスキャナ（5）により読み取られる。このレーザスキャナ（5）は、マイクロコンピュータ（11）によりスキャナドライバー（12）を介して駆動される。マイクロコンピュータ（11）は、レーザスキャナ（5）により読み取られたバーコードデータを

メモリ(13)に記憶したり、ディスプレイ(6)に数値として表示したりする。また、キーボード(7)に設けられた読み取り開始キー(7a)を押下することで、レーザスキャナ(5)によるバーコードの読み取りを開始する。

【0015】なお、上記カッコ内の符号は、図面と対照するためのものであるが、何等本発明の構成を限定するものではない。

【0016】

【実施例】以下、図面に基づいて、本発明の実施例について説明する。

【0017】図1は、本発明に係る水道、ガス、電気等の使用量を表示する流量検出装置であるメータボックス1とその表示カウンタ2に表示された使用量に対応する、バーコードを読み取る、携帯型の端末装置4を示す図である。

【0018】液晶ディスプレイ3は、水道、ガス、電気等使用量を示す上記バーコードを所定時間間隔で表示するものである。

【0019】また、この携帯型の端末装置4には、バーコードを読み取るためのレーザースキャナ5が設けられている。

【0020】一般に、バーコードをレーザースキャナにより遠隔的に読み取るには、読み取り対象の白黒のコントラスト比が2倍以上あれば可能とされている。一方、液晶ディスプレイでは、画面を見る角度によってコントラスト比が変化するため、通常は最大コントラストで示され、この値は、STN(スーパーツイストネマチック)液晶では100倍程度、アクティブマトリクス液晶では1000倍以上が達成されている。従って、このような液晶表示パネルであれば、画面にある程度正対した位置からであれば、レーザースキャナによる白黒のコントラストの判別は可能である。

【0021】更に、一般的なバーコード規格として、EANやUPC等が用いられているが、バー寸法は、0.26~0.56mmとされており、液晶モジュールにおいても、高精細のものはドットサイズ0.2mm程度まであるので、上記規格に対応したバーコードを表示する液晶表示パネルの作成は可能である。

【0022】従って、レーザースキャナの分解能に対応した線幅のバーコードを液晶表示させることによって、図1のような構成を実現することができる。

【0023】メーターボックス1の前面パネル1aには、上記したように、表示カウンタ2が設けられている。また、このメーターボックス1の前面パネル1aには、太陽電池8等の個別電源と、前記表示カウンタ2とは別個に前記使用量をバーコードに変換して表示させる前記液晶ディスプレイ3が設けられている。

【0024】また、メーターボックス1内部の回路構成を図2に示す。

【0025】図2において、2aは水道、ガス、電気等の使用流量を検出する流量検出器であり、2bは流量検出器で検出された流量値をA/D変換してデジタル値に変換するA/D変換器、また2cはデジタル変換された流量値を表示カウンタ2に数値表示したり、刻々変化する流量値(デジタル値)に対応するバーコードパターンをメモリ9から読み出して、カウンタ10により計時される所定時間間隔毎に液晶ディスプレイ3に表示するマイクロコンピュータ(CPU)である。

【0026】なお、メモリ9には、データの書き込み可能なRAM(ランダムアクセスメモリ)からなる部分と、データの読み出しのみが可能なROM(リードオンリーメモリ)からなる部分がある。ROM部分には、数値に対応したバーコードパターンや、制御プログラム等が記憶されている。

【0027】図3は、端末装置4内部の回路構成を示すものである。

【0028】図3において、キーボード7は、読み取り開始キー7aや数値キー等を有するものであり、マイクロコンピュータ(CPU)11は、読み取り開始キー7aの押下に対応してスキャナドライバー12を介してレーザースキャナ5を駆動する。また、マイクロコンピュータ(CPU)11は読み取ったバーコードデータを数値等に変換してディスプレイ6に表示したり、メモリ13に記憶したりする。ディスプレイ6は液晶表示パネルから構成されててもよいし、CRT(カソードレイチューブ)により構成されていてもよい。

【0029】なお、上記メモリ13にも、データの書き込み可能なRAM(ランダムアクセスメモリ)からなる部分と、データの読み出しのみが可能なROM(リードオンリーメモリ)からなる部分があり、ROM部分には、文字パターンや制御プログラム等が記憶されている。

【0030】検針員は、上記携帯型の端末装置4のバーコード読み取り用レーザースキャナ5を、レーザーが届く範囲で上記液晶ディスプレイ3に向け、読み取り開始キー7を押す。ここで、バーコードの読み取りが正常(又は異常)に終了したか否かを、ビープ音等により検針員に知らせるようにすることもできる。

【0031】読み取られたデータは、上記携帯型の端末装置4の表示画面6に内容表示されると共に、内部のメモリにストアされ、後に検針員がホストコンピュータに入力することも可能である。

【0032】(他の実施例)上記実施例では、液晶ディスプレイ3に表示する情報が水道、ガス、電気等の使用量のみであったが、この他に、各世帯毎の個別情報(世帯主名や住所等をコード変換した情報)を同時にバーコードにより表示させ、一括して読み取らせるようにしても良い。

【0033】また、上記実施例では、液晶ディスプレイ

3に表示されるバーコードが所定時間間隔毎に表示される様にしたが、検針員がメータボックスを検針に来たときのみ、メータボックスに設けられたスイッチによりバーコードを表示させたり、端末装置に設けられた所定キーを押すことによりバーコードを表示する様にさせても良い。更に、検針員がメータボックスの前に来たことを、メータボックスに設けられたセンサにより検出して、バーコードを自動表示する様にさせても良い。

【0034】

【発明の効果】本発明に係るメータボックス及び端末装置、そしてそれらを利用した検針システムによれば、メータボックスの検針作業における、検針員のカウンタの読み取り時のミスや、キー入力時のミスにより誤入力が発生したり、また雨天等のときは、端末装置への検針員の作業効率が著しく低下するということがなくなり、更には、メータボックスの設置場所等によって、カウンタの数値の読み取りが困難な場合にも、端末装置への検針員の作業効率が著しく低下するということも解消することができる。

【図面の簡単な説明】

【図1】本発明の実施例に係る、流量検出装置（メータボックス）及び端末装置を示す図。

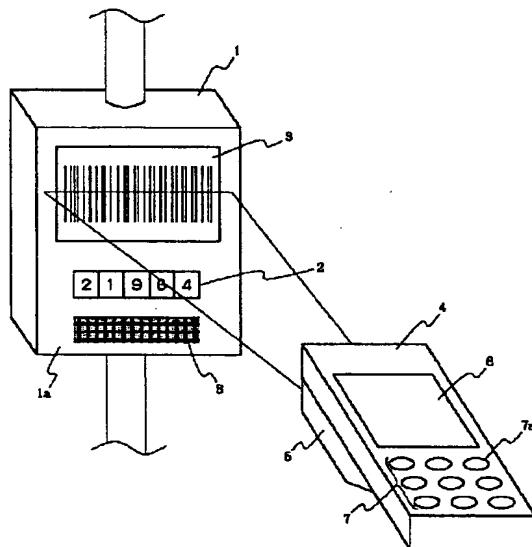
【図2】本発明の実施例に係る、流量検出装置（メータボックス）の回路構成を示す図。

【図3】本発明の実施例に係る、端末装置の回路構成を示す図。

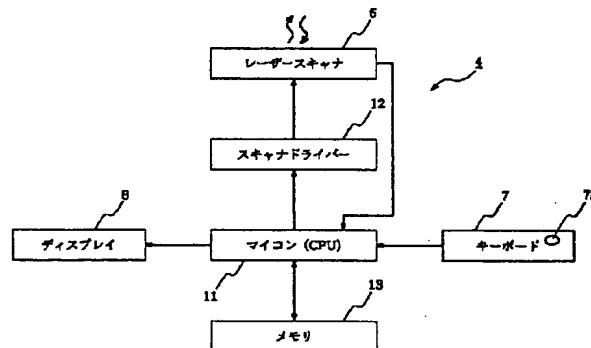
【符号の説明】

- 1 メータボックス
- 2 表示カウンタ
- 2 a 流量検出器
- 2 b A/D変換器
- 2 c マイクロコンピュータ（CPU）
- 3 液晶ディスプレイ
- 4 携帯型端末機器
- 5 レーザースキャナ
- 6 表示画面
- 7 キーボード
- 7 a 読み取り開始キー
- 8 電源
- 9、13 メモリ
- 10 カウンタ
- 11 マイクロコンピュータ（CPU）
- 12 スキャナドライバー

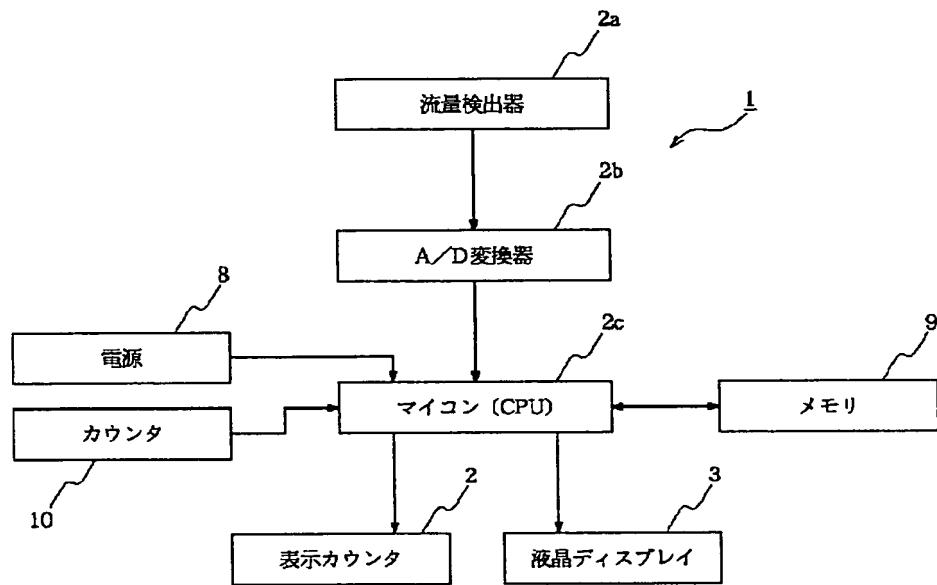
【図1】



【図3】



【図2】



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